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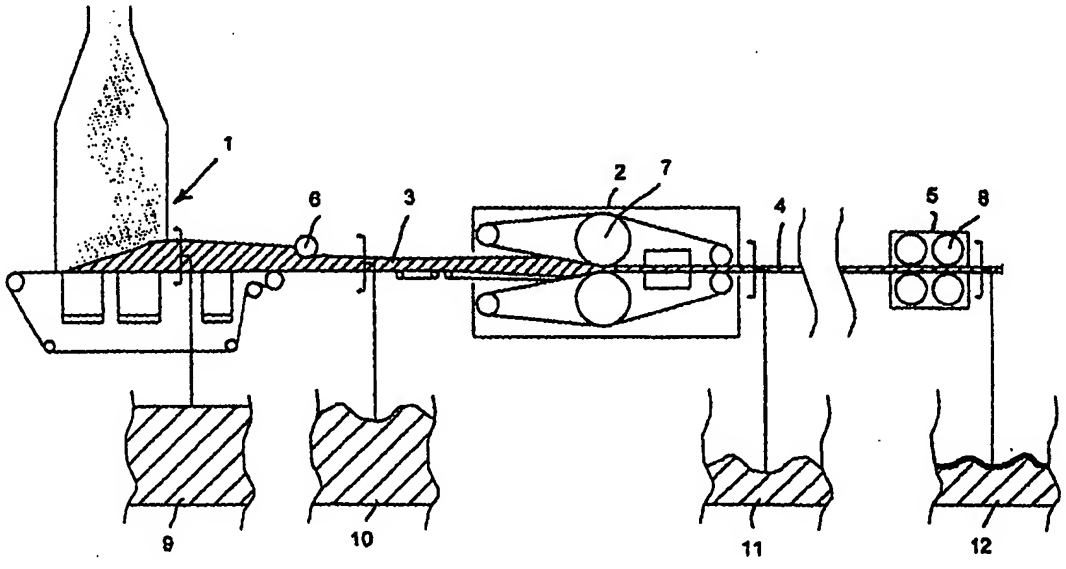
(54) Title: METHOD AND ARRANGEMENT FOR THE CONTINUOUS MANUFACTURE OF PROFILED LIGNOCELLULOSE-CONTAINING BOARD OR STRIP-LIKE PRODUCTS



(57) Abstract

In a method and an arrangement for continuously producing profiled, lignocellulose-containing board or strip-like products the fibre material is disintegrated into particle and/or fibre form, which are then dried, glue-coated and formed into a fibre mat (3). This is pressed into a board or strip-like product (4) while injecting steam. Prior to pressing, the fibre mat (3) is given a surface profile, which is maintained during the steam injection process, whereupon the surface of the board of strip-like product is compressed with this profile.

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METHOD AND ARRANGEMENT FOR THE CONTINUOUS MANUFACTURE OF PROFILED LIGNOCELLULOSE-CONTAINING BOARD OR STRIP-LIKE PRODUCTS

The present invention relates to a method of continuously producing profiled lignocellulose-containing board or strip-like products according to the preamble of claim 1, and to an arrangement for carrying out the method in accordance with the preamble of claim 7.

A common way of producing, e.g., profiled structural elements such as skirting boards, cornices, window linings, architraving or furniture components is to plane or mill the desired profile either from solid wood or from fibreboard, preferably MDF (Medium Density Fibreboard). The unsuitability of using this technique to mill such products from medium density fibreboard is obvious. Firstly, it would involve a production chain and transport chain consisting of many expensive intermediate steps and operations and would mean that the profiled product would have different densities in cross-section and therewith absorb different amounts of paint or varnish at discrete locations. The milling operation would also result in high material losses. For instance, more than 50% of the starting material can be lost when milling products to pronounced profile depths.

A standard example of this production chain may be as follows: Dried and glue-coated fibres are produced in the MDF plant and shaped into mats which are pressed into boards which are then edge-trimmed and ground. Losses are experienced in the form of edge trim and dust from the grinding operations. The next link in the production chain consists in the transportation of board to the production unit for the profiled products. In the third link, the medium density fibreboards are sawn into strips which form the starting blanks for the profiled products, these starting blanks being milled and ground as well as lacquered with layers of paint or varnish or are coated with some type of film for priming or decoration purposes.

The object of the present invention is to avoid the drawbacks associated with the aforesaid production process in an economical fashion and, instead, to provide a continuous process up to the finished profiled product with as little mate-

rial loss as possible. This object is achieved in accordance with the invention having the characteristic features set forth in the following Claims.

The invention will now be described in more detail with reference to the accompanying drawing, which illustrates schematically in longitudinal section an inventive plant with four separate cross-sections shown in larger scale.

The illustrated plant is based on the plant illustrated in SE 502 272, which describes a continuous steam injection process. Disintegrated, dried and glue-coated lignocellulosic fibre material is delivered to a forming station 1 and there formed into a fibre mat 3 which is fed into a steam injection press 2. The fibre mat is pressed in the press into a board product 4 which is hardened, or cured, to an extent at which the board is solid and has a given mechanical strength. The surfaces are further densified in a surface densifying unit 5. This process results in board that has a dense outer surface.

According to the invention, the plant is designed for the production of profiled board or strip products in one and the same two-step process. To this end, a milling or cutting roll 6 is arranged between the forming station 1 and the steam injection press 2. The cutting roll 6 functions to impart a profiled surface structure to the lignocellulosic, glue-coated starting material in the form of the fibre mat 3 that has a density of between 20 and 200 kg/m^3. To this end, the diameter of the cutting roll 6 varies across its width. The profile imparted to the cross-section of the mat will coincide essentially with the cross-section of the finished product. The profiled mat 3, which may be precompressed, is transported continuously into the steam injection press 2. This press includes a profiled steam roll 7 that has the same profile as the cutting roll 6. The mat 3 is compressed here and hardened to form a board or strip 4 that has the intended cross-section, by injecting saturated or superheated steam into the mat. The surface layers are further compressed in a second step, by allowing the board or the strip 4 to pass through the surface densifying unit 5 that includes one or more hot, compression roll-pairs 8 that have the same geometry as the steam roll 7 but a smaller cross-sectional area so as to obtain the desired surface compression. The surface temperature of the roll pairs 8 may lie between 100 and 350°C, preferably between 150 and 250°C.

The drawing shows the cross-section 9 of the formed fibre mat 3 prior to profiling the mat. The cross-section 10 downstream of the cutting roll 6 illustrates the profile of the upper surface. Downstream of the steam injection press 2, the board 4 pressed therein will have the cross-section 11, and the surface sheet in the cross-section 12 downstream of the surface densifying unit 5 will have a higher density but the same profile.

The underside of the board can be profiled with the same technique. In this respect, a cutting roll 6 is also arranged on the other side of the fibre mat 3 and the lower rolls 7 and 8 in the steam injection press 2 and the surface densifying unit 5 are provided with the same surface profile as the lower cutting roll across the respective widths thereof.

It may be of interest in certain applications to provide certain parts of the profile with a greater density, e.g. on exposed tops. This is made possible by allowing the profile on the rolls 7 and 8 to deviate from the profile on the cutting roll 6 at these points.

In one alternative embodiment, the board or the strip produced in the first step, i.e. in the steam injection press, can be divided into several narrower strips in a continuous process, these narrower strips then being passed through one or more hot roll pairs 8 in the surface densifying unit 5. Separation of the board or strip into a plurality of strips may be effected by sawing, for instance.

The invention enables the production of profiled lignocellulose-containing products in the form of boards and strips of uniform density throughout the whole of their cross-section and with dense surfaces that absorb equal amounts of paint over the entire product in a rapid and continuous process. Furthermore, this is achieved in the absence of losses in starting material, apart from the small losses that occur when sawing the board or strip.

CLAIMS

1. A method of continuously manufacturing profiled lignocellulose-containing board or strip-like products, wherein lignocellulosic fibre material is disintegrated to a particle and/or fibre form and the particles or fibres then dried, glue-coated and formed into a fibre mat which is pressed in a steam injection press to produce board or a strip-like product (4), **characterized** in that prior to being pressed the fibre mat (3) is given a surface profile which is maintained during the steam injection process, whereupon the surface of the board or strip-like product is compressed.

2. A method according to claim 1, **characterized** in that the fibre mat is formed with a bulk density of between 20 and 200 kg/m^3.

3. A method according to claim 1 or 2, **characterized** in that the fibre mat is precompressed.

4. A method according to any one of claims 1 - 3, **characterized** in that the steam injected board or strip-like product is divided continuously into narrower strips prior to said surface compression.

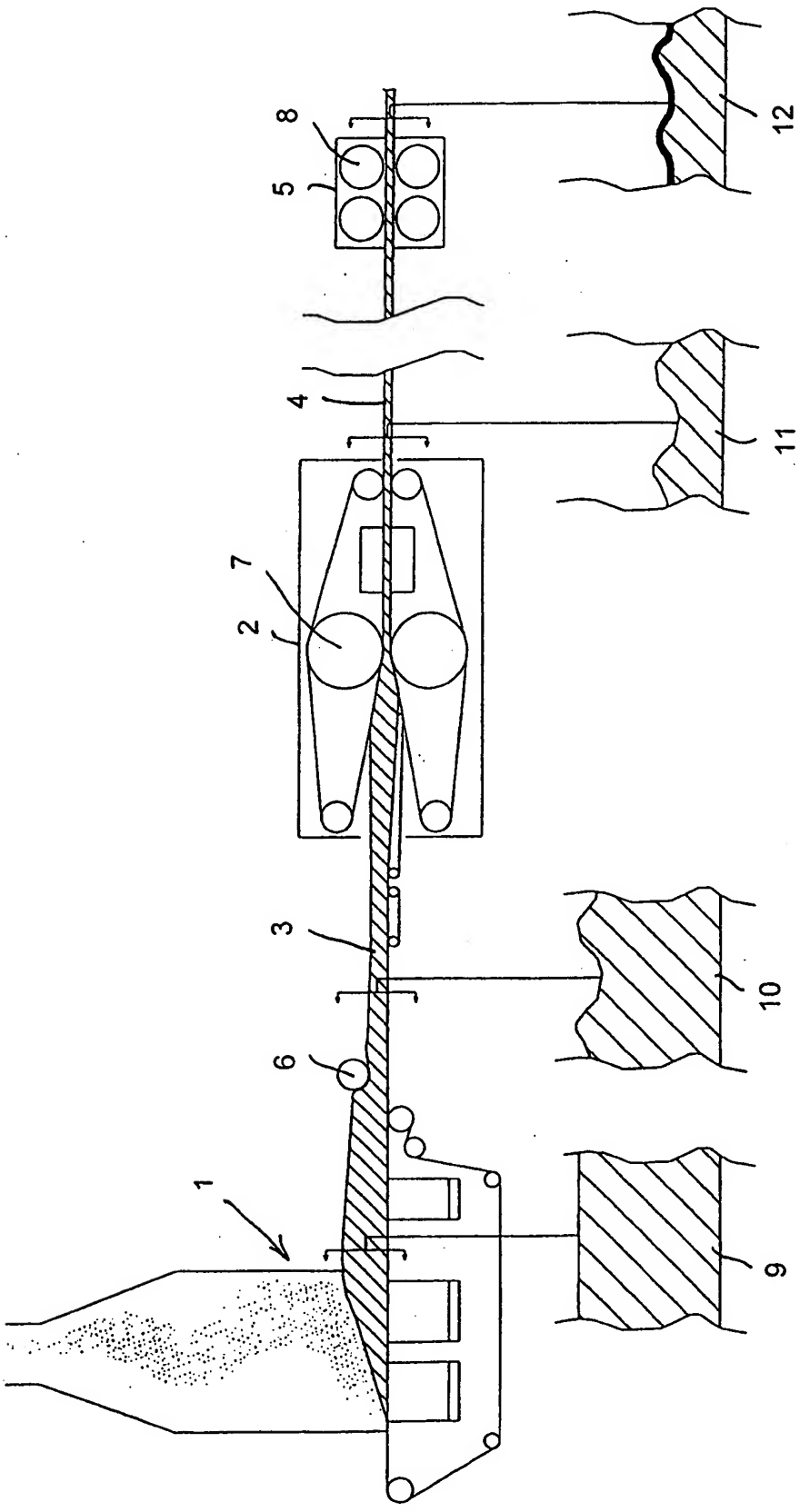
5. A method according to any one of claims 1 - 4, **characterized** in that the board or strip-like product is given a varying density across said surface.

6. A method according to any one of claims 1 - 5, **characterized** in that a surface profile is formed on both the top and bottom sides of the product.

7. Arrangement for applying the method according to any one of claims 1 - 6 and comprising a forming station (1), an injection press (2) for pressing a fibre mat (3) arriving from the forming station (1) into a board or strip-like product (4), and a surface densifying unit (5) for further treating said product, **characterized** in that at least one milling or cutting roll (6) is provided between the forming station (1)

and the steam injection press (2) for providing the fibre mat with a surface profile; and in that the steam injection press (2) and the surface densifying unit (5) are each provided with at least one roll (7 and 8 respectively) that are profiled across their width.

8. Arrangement according to claim 7, **characterized** in that the steam roll (7) in the steam injection press (2) has the same profile as the milling or cutting roll (6) whereas the press roll (8) in the surface densifying unit has a profile whose diameter is greater than that of the profile on the steam roll (7) at certain extreme points.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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B27N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5179986 A (LAUREN J. BEUVING ET AL), 19 January 1993 (19.01.93), column 1, line 12 - line 22, abstract ---	1-8
A	SE 502272 C2 (SUNDS DEFIBRATOR INDUSTRIES AB), 25 Sept 1995 (25.09.95), page 4, line 28 - line 38, abstract ---	1-8

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Information on patent family members

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